Interdisciplinary Collaboration in Healthcare Systems: An Empirical Study

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Abstract

A review of the literature of social work and healthcare systems reveals that in spite of the numerous arguments that have been provided as to the importance of identifying and managing the supportive or hindering factors in interdisciplinary collaboration, there are still many questions that the relevant literatures leave unanswered. This paper reports on an empirical study that investigates the factors that associated with interdisciplinary collaboration in the field of social work. The study findings show that collaboration among interdisciplinary professional engages various elements including 'Collective Ownership of Goals', 'Reflection on Process', 'Interdependence', 'Communication', 'Openness', and 'Trust'. The findings also reveal that there are relationships among some of the factors, facilitating interdisciplinary collaboration. The study will have significant contribution to both theory and practice in the field of social work. While the findings shed light on the elements involved in interdisciplinary collaboration, the findings also can be used as framework towards improving social services.

Keywords

Collaboration, healthcare system, technology orientation, communication, empirical study.

INTRODUCTION

Effective collaboration among professionals in social work is important for providing services successfully. Medical and technological advances over the last decades, have led interdisciplinary collaboration to be underlined as a solution to deliver more effective and appropriate health care and social work services. However, due to the diversity of expertise in a social work team, creating successful collaboration could be highly challenging. Differences in knowledge and experience backgrounds, way of communication, and approaches to solving issues are just examples of the elements that may make collaboration among professionals from different disciplines difficult. Moreover, collaboration has not been yet fully understood and operationalized (Gaboury, Bujold, Boon, and Moher, 2009a).

As the Institute of Medicine of the National Academy of Sciences describes in its report, the explosion of scientific knowledge in all features of health care requires the health professionals to develop new skills to be able to make use of new knowledge through collaborative teams (Committee on Quality, 2001). Due to the need in health care for the high level of expertise in a particular field, professionals in health care are typically trained in separate educational settings and disciplines, which do not necessarily prepare them for complex collaborative settings (Torrens, 2010). Accordingly, while the professionals in health care are highly competent in a specific field, they are virtually unaware of others' specific areas. The increasing complexity and challenges around health care, in terms of technological and knowledge advances, has made it extremely challenging in the healthcare services to find a proper mix of professionals together in order to produce high-quality care. The difficulty is not necessarily due to the lack of clinical expertise in the individual professions, but rather it is because of the lack of knowledge among the professional teams as to how to work in multidisciplinary teams (Torrens, 2010). The increasingly rapid development in the body of knowledge in the healthcare filed, and the essentiality of the extremely high level of expertise in producing high quality care, distinctively differentiate inter-professional collaboration in healthcare from other typical fields with inter-professional nature. The current study investigates what factors and how affect inter-disciplinary collaboration in healthcare.

Interdisciplinary collaboration has been referred to in many studies as an essential element of successful and effective social works and services (Bronstein, 2002). If interdisciplinary collaboration is deemed to improve the quality of social work services, identifying and understanding the elements that aid or hinder the occurrences of interdisciplinary collaboration would be important in order to facilitate the collaboration among the professionals. Therefore, this study aims to explore the collaboration and other factors such as collective ownership of goals, reflection on process, interdependence, communication, openness, trust, and technology orientation that are found to have a type of relationship in health care and IS literature.

The rest of the paper is organized as follows: Literature review provides background information on the constructs, collective ownership of goals, reflection on process, interdependence, communication, openness, trust, and technology orientation. Literature review section is followed by research methodology, and data analysis and results. Then, discussion and conclusion section finalizes the paper.

LITERATURE REVIEW

Collaboration is a dynamic and complex collegial-like relationship and interaction between and among a group of co-workers towards achieving shared goals (Gaboury, Bujold, Boon, and Moher, 2009b). Oandasan et al. (2004) define collaboration as a "dynamic, interactive, transforming interpersonal process" (p. 66). Success in such a relationship relies on mutual respect and trust (Siegler and Whitney, 1994), and open communication (Stichler, 1995).

Interdisciplinary collaboration refers to the partnership of the members from various fields work collaboratively towards achieving a common goal (MacIntosh and McCormack, 2001). Comparing to other forms of relationships such as cooperation, coordination, partnership, and communication; interdisciplinary collaboration is characterized as a constructive and positive collaboration, not a natural one (Bronstein, 2002). Bruner (1991) defines interdisciplinary collaboration as "an effective interpersonal process that facilitates the achievement of goals that cannot be reached when individual professionals act on their own" (p. 3). The following factors influence collaboration.

Collective Ownership of Goals

Interdisciplinary collaborations are built based on a shared goal or specific outcome, which the members aim to achieve through a common decision-making process (Wells-Wilbon and McDowell, 2001). Collective ownership of goals refers to "shared responsibility in the entire process of reaching goals, including joint design, definition, development, and achievement of goals" (Bronstein, 2003, p. 301). The collective feeling of the ownership of the goal(s) gives the members the understanding that their efforts are critical in the success or failure of the collaboration. This element implies that each member of the disciplinary collaboration takes responsibility for their part in the failure and success of achieving the pre-set goals (Bronstein, 2002). The aforementioned literature leads us to the following hypothesis:

> *Hypothesis 1: Collective ownership of goals is positively associated with interdisciplinary collaboration in healthcare industry.*

Reflection on Process

According to John Dewey (1933), reflection connects the world of experience with the world of ideas. Reflection is an in-depth consideration of events by which people strive to understand the situations, their thoughts and feelings about it, as well as of those who are involved, considering all the scenarios from as many angles as possible (Bolton, 2010). Reflection plays a critical role in learning. In interdisciplinary collaboration, reflection on process allows the collaborators to pay attention to and incorporate feedback about their process of working (Bronstein, 2002).This way the collaborators are able to generate different ideas and opinions towards making informed decisions (O'Connor and Hyde, 2005). Collaborators talk about their work relationship, share their thoughts about the work processes, and incorporate feedback to improve and strengthen their collaborative relationship (Bronstein, 2003). Therefore, we hypothesize the following:

Hypothesis 2: Reflection on process is positively associated with interdisciplinary collaboration in healthcare industry.

Interdependence

Interdependence refers to mutual dependency (Oandasan et al., 2004). In an interdisciplinary collaboration, practice relies more on interdependence than autonomy (Evans, 1994). That is, the professional members rely on one another in order to accomplish their shared goal (Bronstein, 2002). MacIntosh and McCormack (2001), providing a comparison between the concepts of multidisciplinary and interdisciplinary, underline that in an interdisciplinary partnership and collaboration, members work interdependently. In multidisciplinary partnership, members from different domains work independently. The interdependence in an interdisciplinary collaboration can be identified based the extent to which the members spent time together formally and informally, and have oral and written communication (Bronstein, 2002). The hypothesis based on the literature is:

Hypothesis 3: Interdependence is positively associated with interdisciplinary collaboration in healthcare industry.

Communication

Collaboration lay on an inter-professional process of communication (Way, Jones, Baskerville, and Busing, 2001). Communication occurs when the information exchanged among the members of the communication leads to the coordination of action (doings, operations) and the modification of behaviour (Zeleny, 2006). In an interdisciplinary collaboration, communication is critical for the members to develop common understandings (Johnston and Banks, 2000), as it allows collaborators to get aware of what their colleagues know (Connelly and Kelloway, 2003). Therefore, in order to develop a collaborative practice, it is highly important to make sure that appropriate communication mechanisms are in place (Cabello, 2002). This leads us to the following hypotheses:

Hypothesis 4a: Communication is positively associated with interdisciplinary collaboration in healthcare industry.

Hypothesis 4b: Communication is positively associated with interdependence.

Openness

Burke and Witt (2002) refer to openness as one's tendency to be intellectually curious, imaginative, and to trying new things. Openness is "a positive and interested attitude toward new experiences, ideas, and perspectives" (König and Glück, 2013, p. 136). In this paper we are referring to openness as the degree to which the members involved in the interdisciplinary collaboration feel free to express their ideas without fear of repercussions or misunderstanding within the group. Openness itself is a signal that there is nothing to hide and fear (Messick and Bazerman, 2001). Openness improves communication and integration of important ideas and knowledge among the people (Rooney, Mandeville, and Kastelle, 2012). In an interdisciplinary collaboration, where the level of openness is low, creativity is ignored and it is not expected that the members are willing to reveal their ideas and to collaborate. This background information leads us to the following hypotheses:

Hypothesis 5a: Openness is positively associated with communication.

Hypothesis 5b: Openness is positively associated with interdisciplinary collaboration in healthcare industry.

Trust

Interpersonal trust is an important antecedent to openness (Roberts and O'Reilly, 1974). Openness increases when there is trust among the interdisciplinary collaborators. Trust plays the role of a channel through which information and knowledge flow. Trust is at the heart of interdisciplinary collaboration. Trust facilitates collaboration by allowing the professionals with different set of knowledge and skills share their ideas and perspectives, and make shared decisions (Canadian Pharmacists Journal, 2007). Depending on the extent to which there is confidence and trust between and among the members of a collaborative team, the level of collaboration may vary. Individual professionals share their knowledge and perspectives with others based on the degree to which they feel confident and trust (Iftikhar, Eriksson, and Dickson, 2003). Trust in interdisciplinary collaboration creates an atmosphere of sharing where members' expertise are discussed and evaluated with respect (Oandasan et al., 2004). When there is trust among the interdisciplinary collaborators, the members share their opinions and knowledge, and learn how to do their job and how to improve their collaboration (Hauschild, 2001; McDermott, 1999). Therefore:

Hypothesis 6a: Trust is positively associated with openness.

Hypothesis 6b: Trust is positively associated with interdisciplinary collaboration in healthcare industry.

Technology Orientation

Technology provides connectivity between and among communities of knowledge and improves collaboration (Olesen and Myers, 1999; Von Krogh, Kazuo, and Nonaka, 2000), and therefore, is regarded to have positive impacts on and increase value creation in team works and collaborations (Poltrock and Handel, 2010; Weiseth, Munkvold, Tvedte, and Larsen, 2006). Technology orientation refers to the extent to which the collaborators tend to use technology towards achieving their shared goals. This element is consistent with Davis' (1989) conceptualization of 'perceived usefulness': "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320). In an interdisciplinary collaboration, the members' perceptions of the use-performance relationship in using technology determine whether or not the collaborators will use technology in their collaboration or not. If the collaborators believe that there is a positive relationship between using technology and their performance, they would use technology; otherwise they may just simply ignore the use of technology to improve collaboration. This leads us to the following hypotheses:

Hypothesis 7: Technology orientation is positively associated with interdisciplinary collaboration in healthcare industry.

Figure 1 summarizes the constructs and hypotheses tested in the study.

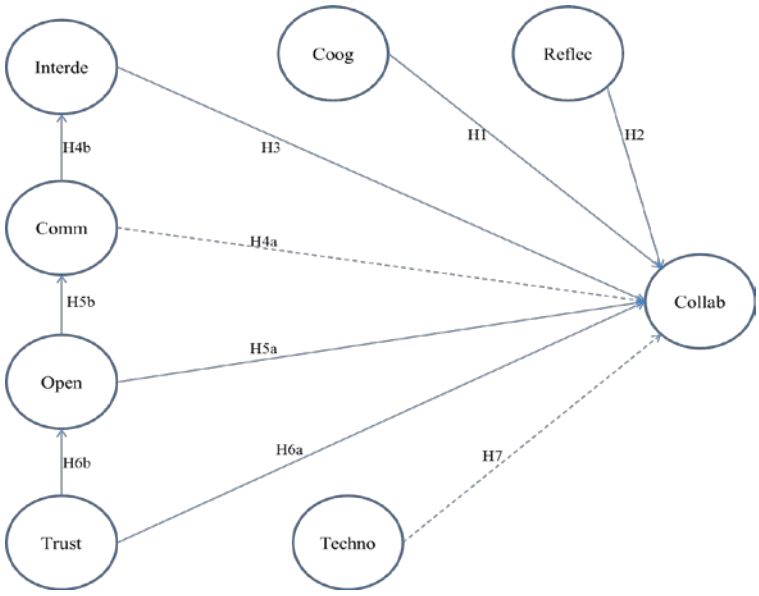

Figure 1: Structural Model with Constructs and Hypotheses

RESEARCH METHODOLOGY

The data collection for this study was through a mail survey sent to Healthcare Professionals in North America. The survey questionnaire was developed based on previously tested instrument developed by Bronstein (2002) and related literature on collaboration in healthcare systems as well as information systems. The questions were modified based on a set of interviews conducted with participants working in healthcare industry. The final survey instrument included 74 questions in total including the demographic questions. The questions were developed using a five-point Likert scale range from 1 (Strongly Disagree) to 5 (Strongly Agree). The respondents were asked to state the degree that they agree with the statements in the survey questionnaire. A pilot test with 30 respondents was conducted to identify any problems with the survey questionnaire.

The final version of the questionnaire survey was mailed to a group of 1300 healthcare professionals working as medical doctors, nurses and nurse practitioners, etc. in North America with an attached cover letter and pre-addresses and pre-stamped envelopes. The potential responders were randomly selected and the contact information of the potential responders was gathered from online databases. The response rate was about 17 % and total returned surveys were 216.

In this study, we utilized SPSS version 20 and WarpPLS 4, an SEM based analysis, for data analysis. PLS, a second generation multivariate method, simultaneously evaluates the measurement model as well as the theoretical model. In addition, this method makes the required adjustments for the relationships (Chin et al., 2003). PLS method provides a robust solution when working with multiple indicators and variables (Kline, 1998). The last but not the least, distributional form of the data is not critical in PLS method.

DATA ANALYSIS AND RESULTS

Prior to testing the hypothesis, a set of analysis such as ANOVA, validity, and reliability tests were conducted. ANOVA test allowed us to test whether there is any difference for answers among the different job categories (see Table 1).

Table 1: ANOVA results for the different job titles

Constructs	Levene Statistic (P-value)	ANOVA		Welch	Brown-Forsythe
		F Value	Significance		
C of Goals	0.318	1.42	0.254	0.250	0.280
Reflection	0.350	3.23	0.034	0.109	0.014
Interdependence	0.222	3.06	0.041	0.245	0.181
Collaboration	0.252	1.710	0.183	0.248	0.189
Trust	0.153	2.367	0.088	0.242	0.134
Technology	0.102	0.956	0.425	0.399	0.425
Communication	0.250	0.660	0.582	0.273	0.452
Openness	0.073	1.799	0.166	-	-

Table 1 reveals the ANOVA results between groups with a randomly selected group of respondents. Although the significance for reflection and interdependence are less than 0.5, other tests including Levene, Welch, and Brown-Forsythe tests show that the results are not significant indicating that there is no difference between the doctors, nurses, practitioners, and managers in terms of the results.

A set of validity and reliability tests were conducted with the data to make sure that the instrument does what it has been designed for and it is a robust tool. Content validity, construct validity, and discriminant validity are the three main methods for testing validity whereas Cronbach's alpha and composite reliability are the most common methods used for testing reliability.

Expert opinion is the common way used for testing content validity (Lynn, 1986). Methods for quantifying the expert opinion include, but not limited to averaging the experts' ratings and using "pre-established criterion of acceptability" (Polit and Beck, 2006; Beck and Gable, 2001). We measured content validity through a group of 4 expert/judges. The instrument was refined after the first round and tested for the second time where 0.8, the threshold for scale-level content validity index (S-CVI) (Polit and Beck, 2006) is reached.

Haynes at al. (1995) defines construct validity as "...the degree to which an assessment instrument measures the targeted construct (i.e., the degree to which variance in obtained measures from an assessment instrument is consistent with predictions from the construct targeted by the instrument" (p. 239). Either exploratory factor analysis (EFA) or confirmatory factor analysis (CFA) using structural equation modeling (SEM), are among the most widely used to test for construct validity (Rubio et al., 2003). In CFA, the method adopted for this study, as

a rule of thumb, loadings 0.5 or higher are considered strong (Hair et al., 2006). Table 2 shows that all variables are loading to expected factors and their loading is above 0.5, indicating no issues on construct validity.

Cronbach's Alpha and composite reliability are two widely used measures of reliability or internal consistency (Fornell, and Larcker, 1981; Nunnaly, 1978). Cronbach's Alpha value of 0.7 is considered as acceptable while 0.6 is considered as marginally acceptable (Gliner and Morgan, 2000). Our results show that the constructs are within either the acceptable or marginally acceptable range. The Cronbach's alpha measures for realibility for the constructs are as follows: 0.759 for Collective ownership of goals, 0.789 for Reflection on process, 0.694 for Interdependence, 0.634 for Collaboration, 0.632 for Trust, 0.826 for Technology orientation, 0.682 for Communication, and finally 0.765 for Openness. Reliability results were also confirmed and supported with composite reliability measure for Collective ownership of goals, Reflection on process, Interdependence, Collaboration, Trust, Technology orientation, Communication, Openness were 0.848, 0.856, 0.804, 0.805, 0.803, 0.920, 0.808, and 0.864, respectively (see Table 2). Based on these results we infer that reliabilities of our constructs are acceptable.

Table 2. Factor Analysis and Loadings

Factors	**Coog**	**Reflec**	**Interd**	**Coll**	**Trust**	**Techn**	**Comm**	**Open**	**Alpha**	**CR**	**AVE**
Coog1	0.766	0.139	0.063	0.124	-0.266	0.008	-0.311	0.104	0.759	0.848	0.584
Coog2	0.651	-0.326	-0.046	-0.221	0.454	0.074	0.162	-0.395			
Coog3	0.826	-0.087	0.077	0.148	-0.023	-0.069	0.126	0.058			
Coog4	0.802	0.222	-0.102	-0.091	-0.092	0.004	0.035	0.161			
Reflec1	0.463	0.662	0.196	-0.159	-0.090	-0.086	-0.188	-0.001	0.789	0.856	0.543
Reflec2	-0.202	0.736	-0.206	0.247	-0.010	0.055	0.016	-0.040			
Reflec3	-0.336	0.786	0.064	0.069	-0.047	-0.096	0.021	0.016			
Reflec4	0.138	0.722	0.120	-0.115	0.092	0.094	0.174	0.036			
Reflec5	0.008	0.773	-0.147	-0.061	0.047	0.031	-0.039	-0.011			
Interd1	-0.032	-0.126	0.718	0.194	-0.140	-0.032	0.140	-0.026	0.694	0.804	0.451
Interd2	-0.123	0.369	0.661	-0.190	0.274	-0.034	-0.203	-0.089			
Interd3	0.272	0.082	0.605	-0.225	0.001	0.022	0.016	0.089			
Interd4	-0.055	0.007	0.723	0.137	-0.165	0.058	-0.110	0.080			
Interd5	-0.031	-0.323	0.645	0.037	0.059	-0.015	0.160	-0.053			
Coll1	-0.106	0.353	-0.129	0.519	0.252	-0.040	0.248	-0.030	0.634	0.805	0.591
Coll2	0.223	-0.250	0.087	0.869	-0.016	0.023	-0.098	-0.034			
Coll3	-0.160	0.039	-0.010	0.866	-0.135	0.001	-0.050	0.052			
Trust1	0.038	0.135	-0.045	-0.040	0.835	0.028	0.044	0.187	0.632	0.803	0.578
Trust2	-0.052	-0.037	0.202	0.004	0.747	-0.036	-0.052	-0.167			
Trust3	0.010	-0.122	-0.163	0.044	0.693	0.005	0.003	-0.045			
Techn1	0.100	-0.097	-0.037	-0.025	0.101	0.923	-0.033	-0.064	0.826	0.920	0.852
Techn2	-0.100	0.097	0.037	0.025	-0.101	0.923	0.033	0.064			
Comm1	-0.080	0.042	-0.118	0.185	-0.142	-0.057	0.757	-0.017	0.682	0.808	0.514
Comm2	0.173	-0.080	-0.054	-0.127	0.255	0.085	0.715	-0.260			
Comm3	-0.305	-0.228	0.196	-0.017	0.066	-0.040	0.622	0.300			
Comm4	0.165	0.219	0.007	-0.051	-0.152	0.010	0.765	0.015			
Open1	-0.231	0.084	-0.156	0.236	-0.039	0.026	-0.028	0.826	0.765	0.864	0.680
Open2	0.044	0.047	0.316	-0.200	-0.051	0.003	0.066	0.816			
Open3	0.186	-0.130	-0.155	-0.038	0.089	-0.028	-0.036	0.832			

Notes:

Coog: Collective ownership of goals
Reflec: Reflection on process
Interd: Interdependence
Coll: Collaboration
Trust: Trust
Techn: Technology orientation
Comm: Communication
Open: Openness

Inter-item correlations are used as a way to test discriminant validity. Inter-item correlations among the constructs as well as average variance extracted (AVE) values in diagonal and in parentheses are shown in Table 3. Our results indicate that the constructs are positively and significantly, either 0.01 or 0.05 level, correlated

except technology orientation and cognitive ownership of goals. Another method to confirm the discriminant validity is the measurement of AVE values. A model is considered having acceptable discriminant validity when square roots of AVE values are greater than the correlations for that variable that are shown below and on the left. As it is seen in Table 3, our results indicate that discriminant validity is acceptable for our model.

Table 3. Correlations and Square Roots of Average Variance Extracted (AVE) Values

Constructs	*Coog*	*Reflec*	*Interd*	*Coll*	*Trust*	*Techn*	*Comm*	*Open*
Coog	(0.764)							
Reflec	0.696**	(0.737)						
Interd	0.563**	0.559**	(0.672)					
Coll	0.588**	0.437**	0.550**	(0.769)				
Trust	0.675**	0.646**	0.554**	0.415**	(0.760)			
Techn	0.062	0.210**	0.226**	0.140*	0.149*	(0.923)		
Comm	0.700**	0.662**	0.585**	0.451**	0.593**	0.144*	(0.717)	
Open	0.687**	0.652**	0.529**	0.477**	0.708**	0.150*	0.576**	(0.825)

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Multicollinearity can be tested via Variance Inflation Factors (VIF). A VIF value of less than 5 indicates no risk of multicollinearity. As shown in Tanle 3, our results indicate no threat of multicollinearity in this study since all VIF values are below the threshold value of 5. In addition, Additional information on model fit and quality indices provide information on the fit of the model in Table 4. Among these indices, Average Path Coefficient (APC), Average Root Square (ARS), and Average Variance Inflation Factors are commonly used indicator for model fit. The result of model fit shows no evidence on problem regarding the fit; therefore, the results indicate that our model has a good fit.

Table 4. Model Fit and Quality Indices

Constructs	*Coog*	*Reflec*	*Interde*	*Coll*	*Trust*	*Techno*	*Comm*	*Open*
Collinearity VIF	3.367	2.552	1.993	1.746	2.540	1.107	2.400	2.554
Average full collinearity VIF (AFVIF)	2.283				acceptable if <= 5			
Average path coefficient (APC)	0.336**							
Average R-squared (ARS)	0.504**							
Average block VIF (AVIF)	2.930				acceptable if <= 5			
Sympson's paradox ratio (SPR)	0.900				acceptable if >= 0.7			

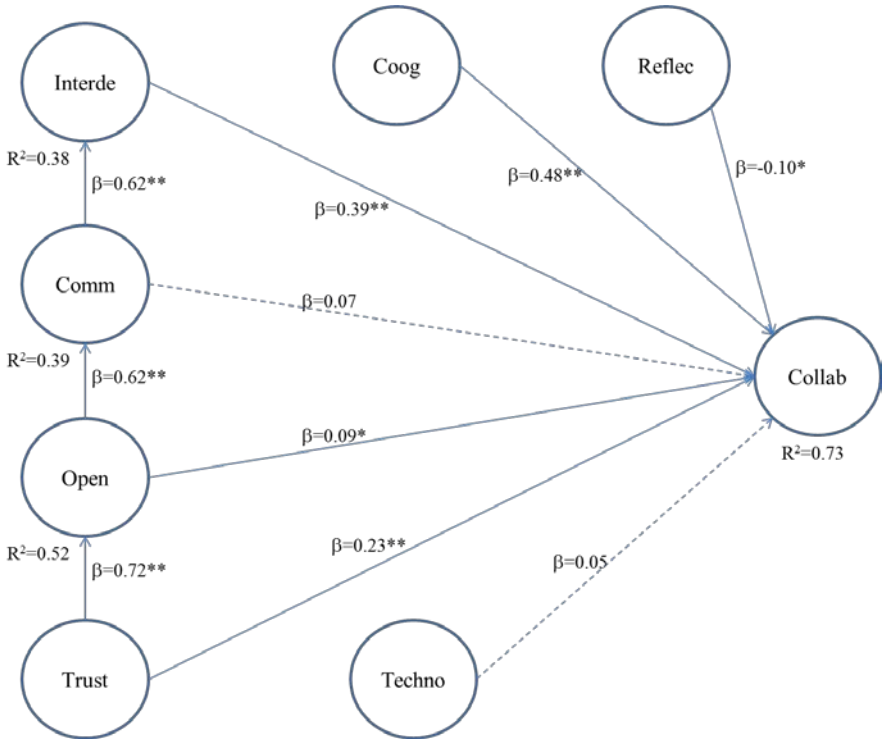

Figure 2: Estimated Parameters in the Model

Path coefficients with their significance level as well as R-square values are presented in Table 5 and Figure 2. The results show that only the relationships between technology and collaboration, and communication and collaboration are not significant. The analysis found positive and significant relationship between trust and collaboration (β=0.23, p<0.01), trust and openness (β=0.72, p<0.01), openness and collaboration (β=0.09, p<0.05), openness and communication (β=0.62, p<0.01), communication and interdependence (β=0.62, p<0.01), interdependence and collaboration (β=0.39, p<0.01), and cognitive ownership of goals and collaboration (β=0., p<0.01). The relationship between reflection on process and collaboration was significant (β=-0.10, p<0.05) but negative. Dashed lines represent the non-significant relationships found in the analysis.

Table 5. R Square Value, Path Coefficients and their Significances

Constructs	*Coog*	*Reflec*	*Interde*	*Coll*	*Trust*	*Techno*	*Comm*	*Open*	R^2	*Adj.* R^2
Coog										
Reflec										
Interde							0.617**		0.381	0.378
Coll	0.477**	-0.097*	0.388**		0.234**	0.053	0.066	0.089*	0.730	0.721
Trust										
Techno										
Comm								0.623**	0.388	0.385
Open					0.719**				0.516	0.514

*. P-Value is significant at the 0.05 level.
**. P-Value is significant at the 0.01 level.

Table 6 summarizes the hypotheses tested in this study and whether they were rejected or not.

Table 6. Hypotheses tested and their status

Hypotheses	**Status**
Hypothesis 1: Collective ownership of goals is positively associated with interdisciplinary collaboration in healthcare industry.	Supported
Hypothesis 2: Reflection on process is positively associated with interdisciplinary collaboration in healthcare industry.	Not Supported
Hypothesis 3: Interdependence is positively associated with interdisciplinary collaboration in healthcare industry.	Supported

Hypothesis 4a: Communication is positively associated with interdisciplinary collaboration in healthcare industry.	Not Supported
Hypothesis 4b: Communication is positively associated with interdependence.	Supported
Hypothesis 5a: Openness is positively associated with interdisciplinary collaboration in healthcare industry.	Supported
Hypothesis 5b: Openness is positively associated with communication.	Supported
Hypothesis 6a: Trust is positively associated with interdisciplinary collaboration in healthcare industry.	Supported
Hypothesis 6b: Trust is positively associated with openness.	Supported
Hypothesis 7: Technology orientation is positively associated with interdisciplinary collaboration in healthcare industry.	Not Supported

DISCUSSION AND CONCLUSION

In order to deepen the understanding on collaboration in healthcare system, this paper empirically examines the concept in relation to several constructs such as collective ownership of goals, reflection on process, interdependence, communication, openness, trust, and technology orientation.

Collective ownership of goals leads to increased collaboration across disciplines. Various conditions exist, where ownership of a goal plays a significant role on the interdisciplinary collaboration. For example, individuals who are committed to work together can overcome several difficulties, which cannot be avoided without serious commitment. This commitment gives colleagues the perception of being part of the bigger picture and doing things that has significant impact on the outcome. Under these circumstances, colleagues are more eager to continue this positive environment and to resolve any conflicts constructively. These conflicts, as long as they are handled professionally, may help to improve the collaboration quality. In this context, conflicts have a positive force on individuals, and freedom to disagree is a critical factor. Through this freedom, individuals can discuss, and collaborate on plans and goals about patients.

Collaboration is an essential part of many processes. Reflection on process is about the "attention" (Bronstein, 2002) that colleagues from other disciplines pay while working together in interdisciplinary collaboration context. Our findings show that when colleagues discuss about their work including current and potential obstacles, strategies to resolve issues and to improve working relationships, and the roles, responsibilities and their degree of involvements, they achieve higher outcomes from their collaboration.

Collaboration is improved via interdependence, which refers to relying on colleagues' accomplishments to be able to complete the tasks and goals successfully (Bornstein, 2002). When colleagues have a good understanding of similarities, differences, and more particularly, the distinction between their roles and others' roles, they can they can collaborate more effectively when tasks are interdependent. Knowing the aforementioned distinction requires communication among the professionals, knowing the job descriptions, however, it does not mean not supporting other colleagues or giving or receiving feedback when required.

Communication can be bidirectional and through communication, professionals exchange information among each other. This exchange of information can improve the understanding of the patients' cases among the doctors or health care professionals. Interestingly our results did not show any direct relationship between communication and collaboration. However, the communication has significant relationship with collaboration through interdependence. This can be interpreted, as type of communication is important for collaboration. Any informal communication may not have an impact on collaboration even if it increases the understanding about patients' cases. This means communication leads to higher levels of collaboration when professionals are aware of each other's roles and know the distinctions. In addition, communication leads to higher collaboration when the professionals rely on each other's accomplishments to complete their tasks or goals.

It is not surprising that trust improves the collaboration in not only healthcare system but also in other work and business environments. Our results indicate that professionals achieve collaboration when there is trust among them. Trust also leads professionals to be more open to each other, to their ideas, advices and critiques. Therefore, trust naturally emerges as another key construct in our study that plays a role on openness, communication, and interdependence.

Openness improves not only collaboration, but also communication. Our results show that when professional trust each other, they are more open to collaborate and communicate on business related matters. Through

openness, professionals discuss more matters without fear of being judged. This reduces the repercussions or misunderstanding among professionals. Openness also has indirect effect on interdependence since openness leads to completing the goals and tasks that require effective communication.

The findings of this study broaden the literature on the factors involved in interdisciplinary collaboration in social work and healthcare systems. Furthermore, by identifying the interrelationship among the factors and their association with collaboration, the paper provides a framework and guideline that can be used by social workers and healthcare professional to improve their collaboration.

The study contributes to the extant literature by underlining the role of informal and face-to-face communication in geographically close interdisciplinary collaboration. Participants did not agree that using technology improves their communication and their effectiveness of work, and this could be due to the feasibility and possibility of face-to-face communication that interdisciplinary collaboration in healthcare provides the interdisciplinary professions with. Although the relevant literature includes several studies and models on technology acceptance, use, etc., in this study we examined professionals' technology orientation and how it affects the collaboration among professionals. Interestingly technology orientation did not have a significant impact on collaboration. The reason for this could also be the industry. Healthcare professionals may not perceive technology as a medium for effective communication and collaboration. This result may be because of the age group of participants. Future studies are recommended to investigate the non-technological elements that facilitate face-to-face communication in inter-professional collaboration. The elements may include interpersonal communication skills, as well as departmental or professional cultures. Future studies could also conduct a comparative investigation of the difference(s) between inter- and intra-disciplinary collaboration in healthcare services. How would collaboration vary in terms of interdependence as well as communication channels and mechanisms within the same and across different professions? How would the inter-professional collaboration vary between the healthcare services and the other fields such as education, governance, politics, and organizations and management? Developing a rigorous and reliable measure of the effectiveness of inter-disciplinary collaboration in healthcare could be a potential area of further research in future.

In sum, the current study, with its limitations, was an endeavour towards broadening both scholarly and practical perspectives of the elements that contribute to the collaboration of multidisciplinary professions in the healthcare practices. Collaboration is inherently a broad area of research. Although this study examined the relationship between collaboration and its factors, the number of constructs can be improved to include antecedents and consequences of collaboration in healthcare system. A case study approach or a longitudinal study can help to capture more constructs on this relationship. In addition, a future study focusing on collaboration from team members' perspective can contribute to the academia and practitioners.

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